

How do digital agricultural startups achieve critical mass?

A qualitative analysis

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Abstract: This paper presents the results of 11 in-depth interviews with digital agricultural startups. The results reveal seven main assumptions startups make about the situation on the agricultural market, their target group, their growth and the challenges they face.

Keywords: startups, critical mass, in-depth-interviews

1 Objective and method

Achievement of critical mass on the market is a complex topic. Critical mass is a certain growth pattern that enables a company to achieve a self-sustaining growth given a certain number of customers [MR99]. To achieve critical mass is every startup's goal because it allows the generation of additional sales with minimal customer acquisition costs. The objective of this paper is to gain a better understanding of how agricultural startups pursue this aim. To reach this objective, the method selected was in-depth interviews. In the qualitative methodology, the in-depth interview method is seen as the best way to "enter into the other person's perspective" [Pa02]. The following criteria were applied to select digital agricultural startups: 1) the startup's website is online and its product or working prototype is ready to be tested or used; 2) the product or solution has been built based on information technology; 3) the product or a solution is scalable. To find such startups, we used the two largest platforms that provide information about startups worldwide: f6s and AngelList. In addition to these two platforms, we used contacts to startups obtained during the Agritechnica fair in Hannover in 2015 and the GIL conference in 2016. In all, 19 startups were contacted; 11 of them agreed to participate in the interviews. Each interview lasted between 40 and 70 minutes. To better structure in-depth interviews, a guideline questionnaire with open questions was prepared. The questionnaire contained questions about founders, product development, early adopters and the startup's network. Most of the interviews were recorded during a Skype conversation. To analyse the interviews, they were transcribed and uploaded to the qualitative data analysis software ATLAS.ti. This software is one of those most used in academic research for analysing qualitative data such as observations, case studies and interviews. In the literature it is possible to find a software guide for ATLAS.ti [Fr14] as well as

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several case studies of the software use [Hw08]. For this research ATLAS.ti helped to structurally analyse qualitative data, identify connections between the interviews and keep records of the observations during the analysis. Table 1 presents information about the startups interviewed.

Country	Interviewees' role	Number of startups	Product phase	Business field
Germany	- cofounder - cofounder - founder - managing director	4	- in development - on the market - on the market - developed and tested	- farm management system - plant disease diagnostic app - farm management system - asparagus monitoring
Israel	business development manager	1	on the market	pest management software
Ukraine	cofounder	1	on the market	navigation and documentation solutions
Australia	cofounder	1	on the market	farm management system
India	cofounder	1	on the market	e-commerce
Indonesia	cofounder	1	on the market	e-commerce
Philippines	founder	1	in development	crowdfunding for farmers
Tanzania	cofounder	1	on the market	e-commerce

Table 1: Description of interviewees

2 Results

The results of the interviews come from two rounds of coding. “A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/ or evocative attribute for a portion of language-based or visual data” [S109]. The first round of coding provided a general impression of the interviews and numerous initial assumptions; the following rounds sought to converge the initial assumptions in all the interviews into a set of core assumptions which were mentioned by the most interviewees. In the first round there were 29 categories of assumptions; in the second round those categories were converged to seven. Each of the seven

codes represents a description of a startup's perspective of the situation on the agricultural market, its target group, its growth and the challenges it faces.

1: There are few IT solutions in the agricultural sector. Most interview participants stated that the current level of technology use in the agricultural sector is low. Many farmers, even big wineries or horticultural companies, use old equipment, for example, tractors that are more than 10 years old, or paper and pencil to keep track of the activities on the field. All interviewees affirm that the competition's level is low and that there are not many easy to use and inexpensive IT solutions for the sector. Interview participants from Asian and African countries also referred to the underdevelopment of the agricultural market with many middle men in the value chain and financial difficulties for farmers, which also often hinder access to new technology.

2: Due to the newness of the technology in the agricultural sector, the first early adopters are keen to help improve the technology. Almost all interviewees had a positive experience developing a product in cooperation with the farmers. In many cases an initial product did not properly function or had just a few functions. First early adopters came into contact with the startups either serendipitously or through recommendations from friends or acquaintances of the founders. Many participants described their early adopters as farmers who already had a certain experience with IT technologies in the field who are open to and interested in getting better solutions. At the same time those early adopters are of diverse age, they manage farms of different sizes and they also have diverse management styles. It is important for all early adopters to gain an immediate value from the use of a prototype or a developed product.

3: Word-of-mouth is paramount for growth during the early stages. Most of the startups interviewed mentioned the importance of word-of-mouth for their initial growth. Often word-of-mouth had a local character. Many startups could see through their tracing systems that, after one or two farmers in a certain region started using their product or service, new users started appearing in that region, but the use of technology normally did not spread into neighbouring regions. Several interviewees affirmed that often the most effective communication channel with farmers is direct contact. Some startups even said that some clients would start using a product only if a neighbouring farmer recommended it.

4: Events play an important role in achieving growth. In this article “events” refers to fairs, exhibitions and presentations. Many startups presented their product for the first time at fairs. Three startups set presenting their solution at a global agricultural fair as a milestone. As a result, all three startups found their first early adopters at those fairs. For one Indonesian startup, participating in one important e-commerce event provided an opportunity to get the endorsement of the Indonesian president and press exposure, which immediately doubled their number of users. Many startups use events as an opportunity to establish crucial contacts with potential partners who can either become investors or connect them with important customers.

5: Trust is the most important factor for farmers. Several startups stated that for many farmers it is extremely important to see how long a company has been in business because for many farmers service plays a more important role than the product itself when making the purchase decision. Good service allows agricultural companies to contact the producer of a product in future and ask for help if something does not work or if something is missing or if product improvements are needed. So, if farmers have already heard about a startup and it has already been on the market for a while, this signals the farmers that it is a startup they can trust.

6: Overcoming local growth as one of the biggest challenges. All startups face the problem of expanding their product or service to other countries or regions. To start growing in a new region, a number of agents should be sent there to present the product because direct contact is the most effective communication channel with farmers. However, this model does not allow a startup to scale fast, and it is connected with additional investments. Several startups found a solution to that problem through partnering with large companies. The main advantage for the large partner in such a cooperation is the additional value for their own services, and for startups the partnership helps to overcome trust problems and reduce customer acquisition costs.

7: Early joint product development is used to achieve critical mass. Several startups started very early to involve their potential users in product development. One of the interviewees affirmed that it does not really matter what kind of product you have; what is important is how the product is developed and how you build the relationships with your users. Most startups presented a very basic product with a minimal number of features to get their first users on board. With these users they are developing a product that will satisfy needs of a later majority. Thus, even without a fully functional product, some startups managed to build their first audience.

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